PB87-186771

Carbofuran: Position Document 1

(U.S.) Environmental Protection Agency
Washington, DC

30 Sep 85

U.S. Department of Commerce
National Technical Information Service
NTIS

50272-101

REPORT DOCUMENTATION PAGE	1. REPORT NO.	2.	PB87-186771

4. Title and Subtitle

CARBOFURAN: POSITION DOCUMENT 1

5. Report Date 9/30/85

6.

7. Author(s)

EPA, OPP, REGISTRATION DIVISION

8. Performing Organization Rept. No. 540/09-87-174

9. Performing Organization Name and Address

ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF PESTICIDE PROGRAMS
WASHINGTON, D.C. 20460

10. Project/Task/Work Unit No.

11. Contract(C) or Grant(G) No.

(C)

(G)

12. Sponsoring Organization Name and Address

SAME AS #9

13. Type of Report & Period Covered

14. 500/01

15. Supplementary Notes

16. Abstract (Limit: 200 words)

This Position Document addresses the risks and benefits of pesticide products containing the subject active ingredient. The Agency has determined that the use of products containing the subject active ingredient may meet or exceed a risk criterion described in 40 CFR Part 154. Potential hazards will be examined further to determine the nature and extent of the risk, and considering the benefits of the subject active ingredient, whether such risks cause unreasonable adverse effects on the environment.

17. Document Analysis a. Descriptors

Pesticides, standards, regulations, manufacturing, chemistry, toxicology, residues, ecology, path of pollutants.

b. Identifiers/Open-Ended Terms

REPRODUCED BY
U.S. DEPARTMENT OF COMMERCE
NATIONAL TECHNICAL
INFORMATION SERVICE
SPRINGFIELD, VA 22161

c. COSATI Field/Group

18. Availability Statement:	19. Security Class (This Report)	21. No. of Pages
Publicly Available	Unclassified	31
	20. Security Class (This Page) Unclassified	22. Price

CARBOFURAN: POSITION DOCUMENT 1

Office of Pesticide Programs
Special Review Branch
US Environmental Protection Agency

September 30, 1985

2560-50

ENVIRONMENTAL PROTECTION AGENCY

[OPP-30000/48]

CARBOFURAN; SPECIAL REVIEW OF CERTAIN PESTICIDE PRODUCTS

AGENCY: Environmental Protection Agency (EPA).

ACTION: Notice.

SUMMARY: This Notice announces that EPA is initiating a Special Review of all granular formulations of pesticide products containing the active ingredient carbofuran. EPA has determined that carbofuran is highly, acutely toxic to birds when used on field corn, sorghum, rice fields, and all other agricultural and non-agricultural sites, and meets or exceeds the risk criteria described in 40 CFR 162.11 and the proposed risk criteria published in the FEDERAL REGISTER of March 27, 1985 (50 FR 12183). Therefore, a Special Review of all granular formulations of products containing carbofuran registered for use on all sites is appropriate to determine whether additional regulatory actions, if any, are required. During the Special Review process, EPA will carefully examine the risks and benefits of using carbofuran products which are registered for these sites.

DATE: Comments, evidence to rebut the presumptions in this Notice, and other relevant information must be received no

later than 45 days from the date this Notice is received or until (insert date 45 days after date of publication in the FEDERAL REGISTER) (whichever is later).

ADDRESS: Written comments identified as "OPP-30000/48" should be sent by mail to:

Information Services Section,
Program Management and Support Division (TS-757C),
Office of Pesticide Programs,
Environmental Protection Agency,
401 M St. SW.,
Washington, D.C. 20460.

In person, bring comments to:

Rm. 236, CM #2,
1921 Jefferson Davis Highway,
Arlington, VA.

Information submitted, or any comment concerning this Notice may be claimed confidential by marking any part or all of that information as "Confidential Business Information" (CBI). Information so marked will not be disclosed except in accordance with procedures set forth in 40 CFR Part 2. An edited copy of the comment containing material claimed to be CBI must be submitted (with the CBI portions deleted) for inclusion in the public record. Information not marked confidential may be disclosed publicly by EPA without prior notice to the submitter. All non-CBI written comments will be available for public inspection

in Rm. 236 at the Virginia address given above, from 8 a.m. to 4 p.m., Monday through Friday, excluding legal holidays.

FOR FURTHER INFORMATION CONTACT: By mail:

Linda E. Zarow,
Registration Division (TS-767C),
Office of Pesticide Programs,
Environmental Protection Agency,
401 M St. SW.,
Washington, D.C. 20460.
Office location and telephone number:
Rm 711, CM #2,
1921 Jefferson Davis Highway,
Arlington, VA,
(703-557-7453).

SUPPLEMENTARY INFORMATION: The term "Special Review" is the name now being used by EPA for the process previously called the Rebuttable Presumption Against Registration (RPAR) process. Modifications to the process are proposed in the new Special Review regulations (50 FR 12183). These modifications include new risk criteria. Until other applicable final regulations are adopted, the present Special Review will adhere to RPAR procedures now in effect and set forth in 40 CFR 162.11.

EPA has determined that a Special Review will be conducted for all granular formulations of pesticide products which contain carbofuran as an active ingredient. EPA has also determined that data necessary to refine the Agency's risk

analysis must be developed. These data include: an extensive, multi-year assessment of bird mortality in the Corn Belt regions of the U.S. and in areas of early planting (e.g., Georgia, Texas), and an assessment of the extent and significance of secondary poisoning of raptors. The Agency announced these data requirements in the carbofuran registration standard issued in 1984.

EPA restricted the use of carbofuran after a registration standard was issued in 1984 because of acute toxicity and occurrence in ground water.

This Notice identifies potential hazards associated with the use of carbofuran on all sites. These hazards will be examined further to determine the nature and extent of the risk, and considering the benefits of carbofuran, whether such risks cause unreasonable adverse effects on the environment.

I. INITIATION OF A SPECIAL REVIEW

A. GENERAL

A pesticide product may be sold or distributed in the United States only if it is registered or exempt from registration under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) (7 U.S.C. 136 et seq.). Before a product can be registered, it must be shown that it can be used without "unreasonable adverse effects on the environment" (FIFRA section 3(c)(5)), that is, without causing "any unreasonable risk to man or the environment, taking into account the economic, social, and environmental costs and benefits of the use of the pesticide" (FIFRA section 2(bb)). The burden of proving that a pesticide meets this standard for

registration is on the proponent of initial or continued registration. If at any time the Agency determines that a pesticide no longer meets this standard for registration, the Administrator may cancel the registration under section 6 of FIFRA.

The Agency has created an administrative process for fully evaluating whether a pesticide satisfies or continues to satisfy the statutory standard for registration. This Special Review process provides a formal procedure through which EPA may gather and evaluate information about the risks and benefits of a pesticide's use. It also provides a means by which interested members of the public may comment on and participate in EPA's decision making process. The regulations governing this process are set forth at 40 CFR 162.11.

A Special Review is begun when EPA determines that a pesticide meets or exceeds one or more of the risk criteria set out in the regulations (40 CFR 162.11(a)(3)). The Agency generally announces the beginning of the Special Review by issuing a Position Document (PD) 1, which is published in the FEDERAL REGISTER. In addition, registrants of affected products will receive the PD 1 by certified mail. Registrants and other interested persons are invited to scrutinize the basis for the Agency's decision to initiate the Special Review and to submit data and information which rebut or support the Agency's determination of risk. Commenters may also suggest methods to reduce risks of use of the pesticide. In addition to addressing risk issues, commenters are encouraged to submit evidence and

discussions of the biological, economic, social, and environmental costs and benefits of use of the pesticide. The public participation stage is described in more detail in Unit IV. This Notice constitutes the PD 1 for granular formulations of pesticide products which are registered for use on all sites and contain carbofuran.

If risk issues are not satisfactorily resolved, EPA will proceed to evaluate the risks and benefits of granular formulations of carbofuran, in order to determine whether to propose regulatory actions to reduce the risks. After providing an opportunity for comment by the Scientific Advisory Panel, the Secretary of Agriculture, registrants, and the public on those actions and the reasons for them, EPA will issue an appropriate final notice. If EPA determines that the risks of use exceed the benefits, EPA will issue a Notice of Intent to Cancel the registration of products intended for such use. The Notice may state the intention to cancel registrations outright or may require certain changes in the composition, packaging, application methods and/or labeling of the product. These changes would be intended to reduce the risks to levels that, when considered against the benefits, will not pose unreasonable adverse effects to man or the environment.

A notice initiating a Special Review is not a Notice of Intent to Cancel the registration of a pesticide, and a Special Review may or may not lead to cancellation. This Notice initiating the Special Review for granular carbofuran products registered for all sites is an announcement of EPA's concern about the safety of the pesticide's use, and only after carefully

considering the risks and benefits of carbofuran and determining that the pesticide appears to cause unreasonable adverse effects on the environment, would EPA issue a Notice of Intent to Cancel.

B. PRESUMPTION OF AVIAN HAZARD

EPA has determined that the use of granular carbofuran products registered for use on all agricultural and non-agricultural sites meets or exceeds existing and proposed risk criteria for hazard to birds. The chemical name for this insecticide is 2,3-dihydro-2,2-dimethyl-7-benzofuranyl methylcarbamate. The trade name for carbofuran is Furadan®. In the following sections of this document the Agency's concerns regarding carbofuran's effects on birds are discussed.

1. ACUTE TOXICITY TO BIRDS

EPA has determined that granular carbofuran products registered as insecticides and nematicides used primarily to control insect populations in corn, sorghum, and other agricultural and non agricultural sites meets or exceeds the existing risk criterion for acute avian toxicity described in 40 CFR 162.11(a)(3)(i)(B)(2). This criterion provides that a Special Review shall be conducted if a pesticide "occurs as a residue immediately following application in or on the feed of an avian species, representative of the species likely to be exposed to such feed in amounts equivalent to the average daily intake of such representative species, at levels equal to or greater than the subacute dietary LC_{50} measured in avian test animals as specified in the Registration Guidelines." The

regulatory intent of this criterion is to identify pesticide uses that cause significant acute mortality of birds. This regulation can be literally applied only to foliar application that leave a predictable toxic residue in or on avian foods. Use of granular carbofuran does not result in appreciable, general contamination of bird foods. The Agency has ample evidence, however, that lethal quantities of granular forms of carbofuran are ingested by birds. Birds may consume carbofuran granules by mistaking them for seeds or perhaps inadvertently when feeding on soil invertebrates such as earthworms (Ref. 1). Because such ingestion of granules has been shown to cause widespread avian mortality in treated fields, the Agency believes the regulatory intent of the dietary residue trigger [162.11(a)(3)(i)(B)(2)] is exceeded for the major agricultural uses of granular carbofuran (e.g. corn, sorghum).

The Agency has proposed new criteria for initiating a Special Review on a specific pesticide. If the criteria are finalized in their current form, a pesticide would be considered for Special Review when its use results in "residues of the pesticide product or its ingredients, impurities, metabolites, or other degradation products in the environment of nontarget organisms at levels which equal or exceed concentrations acutely or chronically toxic to such organisms...." Available laboratory and field data indicate that granular formulations of carbofuran meet or exceed this proposed criterion.

On the basis of scientific studies reviewed by the Agency, EPA concluded that carbofuran in its granular formulation is

highly toxic to birds and its use results in significant fatalities of many small species of birds and also secondary poisoning of birds of prey.

Carbofuran is known to be an acutely toxic pesticide to birds, (fulvous whistling ducks LD_{50} = 0.2 mg/kg, mallard LD_{50} = 0.48 mg/kg), (Ref. 2), and it is widely used in granular formulations. Consumption of single granules of carbofuran may be fatal to many small birds as demonstrated by the following data (Ref. 3):

Percent Fatality Among Two Avian Species Administered Furadan® 10G

Species		Dosage (Number of Granules) 1	5
House Sparrow	Trial 1	100%	---
	Trial 2	80%	---
Red-winged Blackbird		20%	80%

Label directions for major uses of carbofuran require soil-incorporation or subsurface application. Application with currently available farm equipment, however, will leave exposed granules available to feeding birds, (Ref. 4). Moreover, soil-incorporation of granules will not prevent hazards to birds such as robins that probe in the soil for invertebrates.

Two field studies have demonstrated that the use of granular carbofuran on corn fields, the major use of carbofuran, will result in substantial avian fatalities. The major study on the effect of granular carbofuran on avian populations associated with corn

fields, was conducted in Utah for FMC Corporation (Ref. 4). Furadan® 10G (10 percent active ingredient (a.i.) granules) and 15G (15 percent a.i.) were applied as a narrow band (seven-inches wide), incorporated into the soil over the seed furrows in randomly selected fields at a rate of 40.0 lb (10G) and 26.7 lb (15G) formulation/acre (4 lb A.I.). Even though the pesticide is soil incorporated, there is evidence that avian fatalities will still occur. Fatalities were observed throughout a 60-day monitoring period. A total of 911 dead birds were found on the corn plots (254 acres) during organized carcass searches. About 91 percent of these birds were horned larks. A total of 504 birds were killed on 15G plots as compared to 373 birds killed on 10G plots, but the difference was not statistically significant (the remaining 34 birds were found on control plots that were adjacent to the treated plots). Other bird species that were found dead included: 21 yellow-headed blackbirds, 19 brown-headed cowbirds, and 19 mourning doves. Four predators were found dead (two ravens, one marsh hawk, and one short-eared owl) and analysis of stomach contents indicated these fatalities resulted from secondary exposure, (i.e. consumption of smaller birds that had been poisoned with carbofuran granules).

Birds observed in the post-treatment plots also showed atypical behavior such as inability to fly, or uncoordinated motion while sitting, standing, or walking. These signs are typical of symptoms associated with acetylcholinesterase (AChE) depression.

A second study, conducted by EPA in Frederick County, Maryland, demonstrated mortality to birds and other non-target animals (some small mammals), from at-plant treatment of corn fields with 10G carbofuran (Ref. 1). Six song birds (Order Passeriformes) were found in the 486 treated acres. All but a blue jay contained carbofuran at lethal levels. Additionally, the fresh partial remains of four American robins and a common grackle were found in newly treated fields, an indication of predators feeding on other birds killed by carbofuran. Two birds were found exhibiting irregular behavior consistent with symptoms of carbofuran poisoning.

The observed fatalities represent only a portion of those occurring at the site. Fifteen corn fields were studied but each field was searched only twice ($\leq$ 24 and 96 hours post-application). Moreover, the search corridors established in fields covered only about 20 percent of field surface. Factors which may account for some of the difference in fatalities observed between this study and the previously described study in Utah include: a more extensive carcass-search was done in the Utah study; and, geographical and ecological differences between the two study sites.

A third study, conducted by the U.S. Fish and Wildlife Service and the U.S. Forest Service (Ref. 6), demonstrated that soil-incorporated use of Furadan® 10G in pine seed orchards resulted in extensive bird fatalities in four locations in the

southern United States (Mississippi, South Carolina, Louisiana, and Florida). The research was undertaken to determine whether improved application equipment would enhance soil-incorporation and reduce avian fatality. The application rate (25 lbs a.i./ acre) was much higher than in corn, but soil-incorporation of granules was considered high (> 99 percent). Searches were conducted only during the first four to five days after application, nonetheless, 96 dead birds were found at the four sites (totaling 117 acres). Possible secondary poisoning of two loggerhead shrikes (one dead, one sick) was also noted.

A fourth study, (Ref. 7) on the effect of granular carbofuran applied to rice fields, was conducted in Texas by the U.S. Fish and Wildlife Service. This study monitored aerial broadcast application of 3 percent a.i. granular formulation to rice fields. The granules were not soil-incorprated, and were available for consumption by birds feeding in the fields. Bird, fish, frogs, crayfish, earthworms, and nontarget insects fatalities occurred in rice fields after treatment with carbofuran (Ref. 7). Specifically, four sandpipers were found dead following the Furadan® 3G treatment; and, a red-winged blackbird was also found dead and one was seen showing signs of poisoning.

These four field monitoring studies discussed above are the only known studies on the effects of carbofuran on wild birds under typical use conditions. All of these studies

demonstrate acute toxicity to birds. Three of the studies, monitoring higher concentration granules (10 to 15 percent a.i.) demonstrated secondary poisoning of birds of prey. From these data, and because granular carbofuran is extensively used (>10 million acres annually), the Agency concludes that acute poisoning of birds probably occurs at most application sites, is not adequately controlled by soil-incorporation of granules, and potentially affects an extensive number of birds.

2. EFFECTS ON BIRD POPULATIONS

EPA has determined that carbofuran may meet or exceed the existing risk criterion in 40 CFR 162.11(a)(3)(ii)(C), which provides that a Special Review shall be conducted if the use of a pesticide "can reasonably be anticipated to result in significant local, regional, or national population reductions in non-target organisms, or fatality to members of endangered species."

The following is a brief summary of available data:

Overall Fatalities

A study conducted for FMC (Ref. 5) is the most extensive evaluation of carbofuran related fatalities available. Six treated corn fields in Utah, totaling 254 acres, were studied. Fields were systematically searched up to 60 days post-treatment, revealing 911 bird casualties. The following table indicates the number of casualties by bird type.

Bird Fatality Occurring in Carbofuran-Treated Corn Fields

Songbirds	884
Doves	19
Ducks	3
Pheasants	2
Hawks	1
Owls	1
Shorebirds	1
TOTAL	911

(found in overall study sites)

A crude mortality rate (number dead/area treated) calculated from these data is 3.6 birds/acre treated.

EPA conducted monitoring of a more limited scope in Maryland in 1980 (Ref. 1). Fifteen fields (486 acres) were searched twice within four days of application; actual area searched in fields was estimated at 62-94 acres. Five confirmed bird deaths occurred in the search area. Two birds also exhibited symtoms of poisoning, and five sites with suggesting evidence of predators feeding on other birds were located in the fields. These data indicate a crude mortality rate of approximately 0.13 to 0.19 birds/acre.

Much more extensive monitoring of carbofuran use on corn would have to be conducted to accurately forecast the extent of bird losses. Moreover, specific studies addressing the

effects of carbofuran on bird population dynamics are not available. In lieu of such information, the Agency concludes that it is prudent to presume that avian fatalities this extensive may be of ecological significance to rare or declining populations, particularly in high use areas.

Of special concern to the Agency is the evidence that secondary poisoning of birds of prey may be an unavoidable and regular consequence of use of granular carbofuran. Available information is not definitive and does not allow accurate prediction of the number of raptors that might be killed or temporarily paralyzed (and exposed to injury).

Incidence of Secondary Poisoning by Bird Type
(Ref. 5)

Marsh hawk	2	(1 dead, 1 sick)
Short-eared owl	1	
Raven	3	(1 dead, 2 sick)
Total	6	

Rate of secondary poisoning = 6/254 acres = 0.024/acre

The Utah study (Ref. 5) is the only long-term monitoring study on the effects on birds as a result of the corn application of carbofuran. This study is therefore considered to present the most accurate depiction of bird fatality available. However, since monitoring is not available for major corn producing areas, uncertainty is acknowledged concerning the

general extent of avian fatality, both primary and secondary, that may occur. Nontheless,the available data indicate a potentially high rate of fatality to exposed avian species.

The actual ecological significance of secondary poisonings is unknown. Exposed populations of several species of raptors are considered weak or declining, and warrant special consideration (i.e., red-shouldered hawks, marsh hawks, and loggerhead shrikes). While carbofuran is not presently considered the causative factor in population declines, carbofuran-related losses may be a significant additive factor. Red-shouldered hawks, for example, which are considered declining, are listed as rare or endangered by several major corn producing states (Iowa, Illinois, Michigan, Missouri, and Wisconsin) (Ref. 8). The red-shouldered hawk population of Iowa has been estimated at 19 pairs (Ref.8) and EPA monitoring showed secondary poisoning of this species by Furadan® 10G (Ref. 9). The Agency considers carbofuran a potential hazard to the remaining red-shouldered hawk population in Iowa, since carbofuran is used extensively throughout the state.

Although the only studies that we have are in corn, rice, and pine seed, these data are representative of avian exposure and potential adverse effects that could occur on other sites where carbofuran is used.

C. COMMENTS ON THE INITIATION OF THE SPECIAL REVIEW

Prior to the initiation of a Special Review, technical registrants receive private notification of the Agency's determination that the criteria to initiate a Special Review may have been met. This notification includes information on the findings and related general information. Registrants then have 30 days following receipt of the notification to rebut the Agency's conclusions.

D. REBUTTAL CRITERIA

All registrants, applicants for registration, and other interested members of the public are invited to submit evidence either to support or to rebut the presumption that carbofuran poses a risk of toxicity to nontarget birds on agricultural crops. Under 40 CFR 162.11(a)(4)(iii) the presumption initiating a Special Review must be rebutted by proving, "that the determination by the Agency that the pesticide meets or exceeds any of the criteria for risk was in error."

Under 40 CFR 162.11(a)(4)(i) the presumption initiating a Special Review for acute effects to nontarget birds may be rebutted by proving that "the formulation, packaging, method of use, and proposed restrictions on and directions for use, the anticipated exposure to an applicator or user and to local, regional or national populations of nontarget organisms is not likely to result in any significant acute adverse effects."

E. CARBOFURAN USE AND ALTERNATIVE USE INFORMATION

Carbofuran is a broad spectrum carbamate insecticide/nematicide produced in the United States. FMC Corporation is the major producer of the technical product. End-use products registered include granular formulations containing 2, 3, 5, 10, and 15 percent active ingredient (a.i.); a flowable formulation containing 4 lb a.i./gal; and a 75 percent wettable powder. Granular formulations may be used as an insecticide on sites such as corn, peanuts, and tobacco. Granular formulations may also be used on nonagricultural sites such as nursery plantings, and commercial plantation of cottonwoods, siberian elms, pine seedlings and southren pine seed orchards. The 4 lb/gal flowable formulation may be used on alfalfa, corn, soybeans, and tobacco. The 75 percent wettable powder formulation may be used on alfalfa. Different formulations and products may be registered for use on the same agricultural crops, but the pests controlled may be different.

Annual domestic usage of all formulations of carbofuran is estimated to be 10 to 11 million pounds active ingredient. Approximately 60 percent of the total usage is on corn and 20 percent on sorghum. Each of the remaining registered sites such as alfalfa, tobacco, peanuts, soybeans, and rice accounts for less than 5 percent of the total carbofuran market.

1. Field corn. Since the early 1980's carbofuran usage on corn declined from approximately 30 percent to just under 20

percent of the total insecticide market on corn. Carbofuran usage as an insecticide is predominately concentrated in the central United States (Nebraska, Minnesota, Illinois, Indiana, Iowa, Missouri, Ohio and Wisconsin).

The use of carbofuran as a corn nematicide comprises less than 5 percent of annual usage on corn. Usage as a nematicide is concentrated in the Southeastern region of the United States.

Most of the carbofuran used on field corn is for the control of the northern and western corn rootworms (Corn Belt and Northern Plain States), European corn borer (Northern Plain States and Great Lake States), wireworms and nematodes (Southeastern States) and southwestern corn borer (Texas).

In addition to the corn pests already mentioned, granular carbofuran may also be used to control: flea beetles, armyworm, the suppression of cutworms, early season suppression of common stalk borer, seedcorn maggot, southern corn billbug, and aid in the control of leafhoppers and white grubs.

Granular carbofuran may be applied at planting to field corn grown under conventional, minimum or no tillage systems. For most pests the granules are applied as a 7-inch band ahead of the planter press wheel and incorporated into the top 1 inch of soil by using an incorporating device or by dragging a short-length chain, or directing the granules into the planter shoe with the seed, or placing the applicator tube directly

behind the planter shoe so that the granules drop into the furrow and are mixed with the covering soil. In areas where sting, stunt, stubby root, root-knot, dagger, lesion, lance and spiral nematodes are the pests of concern, a broader band (7" to 15") is made, and the granules are incorporated into the top 3 inches of soil. Also, where seedcorn maggots or second to third generation southwestern corn borers are of major concern, the granules should be applied only into the seed furrow. The rates of application vary with the target pest and range from 1.2 to 3.6 oz. a.i. per 1,000 linear feet of row.

Post-emergent soil applications may be made for the control of northern and western corn rootworms. Granules are applied at the rate of 1.2 oz. a.i. per 1,000 ft. of row by banding over the row or applying on both sides of the row, just ahead of the cultivator shovels so that the granules will be covered by soil.

Foliar applications may also be made for control of southwestern corn borer (second to third generation) and European corn borers if no more than 1.2 oz. a.i. per 1,000 ft. of row were made at planting. The application of 1.0 lb a.i./acre is made by aerially broadcasting the granules over the plants, or by directing the granules into the whorls with ground equipment. The label directions state that no more than two foliar applications can be made per season.

The granules spilled during loading or turning at the end of rows are covered or incorporated into the soil by disking.

2. Sorghum. In recent years, usage of carbofuran on sorghum has decreased in a manner similarly to the trend observed in the corn market. The amount of carbofuran used on sorghum has declined since the early 1980's from over 30 percent to less than 20 percent of the total sorghum insecticide market. Carbofuran is used typically to control greenbugs and chinch bugs in most sorghum-producing regions. However, usage is concentrated in the central U.S. (South Dakota, Nebraska, Kansas, Oklahoma and Texas).

Granular carbofuran is applied at planting time to control greenbug and chinch bug infestations on sorghum grown for grain or forage. The 10 or 15 percent a.i. granulars may be applied directly to the seed furrow or as a 7-inch band over the row. The granules must be incorporated into the top 1 inch of soil using a planter fitted with a press wheel, dragging a short length chain or other suitable incorporating device. The rate of application is 0.9 to 1.2 oz. a.i. per 1,000 linear ft. of row for greenbug control and 1.2 oz. a.i. per 1,000 linear ft. of row for chinch bug control. In addition to these two pests, a Special Local Needs (under section 24(c) of FIFRA) registration permits the use of a 15G formulation for the control of the sugarcane aphid, southern corn rootworm, and corn leaf aphid on sorghum in Texas. The granulars are to be applied as a 7-inch band at planting at a rate of 1.35 oz. a.i. per 1,000 linear ft. of row.

The granules spilled during loading or turning at the end of rows are covered or incorporated into the soil by disking.

3. Alternative chemicals. The likely alternatives to carbofuran for the control of corn rootworms in field corn at the time of planting are: terbufos (Counter®); fonofos (Dyfonate®); chlorpyrifos (Lorsban®); fensulfothion (Dasanit®); phorate (Thimet®); trimethacarb (Broot®); isofenfos (Amaze®); ethoprop (Mocap®); and carbofuran flowable (Furadan® 4F).

F. OTHER INFORMATION REQUESTED

In addition to submitting evidence to rebut the presumption of risk in the Special Review, 40 CFR 162.11(a)(5)(iii) provides that a registrant or applicant "may submit evidence as to whether the economic, social and environmental benefits of the use of the pesticide subject to the presumption outweigh the risk of use." If the presumption of risk is not rebutted, the benefits evidence submitted by registrants, applicants, and other interested persons will be considered by the the Agency when determining the appropriate regulatory action.

Registrants, applicants or other interested persons who desire to submit benefits information should consider submitting information on the following subjects along with any other relevant information.

1. Identification of the biological and economic importance of granular carbofuran formulations.

2. Identification of alternative pesticides and non-chemical

methods of control, and information concerning the wildlife effects, potential for wildlife exposure, and/or any human effects and potential for human exposure associated with alternatives.

3. Comparative performance studies which compare the granular and flowable formulation of carbofuran.

4. Comparative performance studies comparing granular carbofuran formulations and likely alternative pesticides.

5. Identification of cultural or integrated pest management practices which are enhanced or limited by the use of granular carbofuran.

G. ADDITIONAL CONCERNS

The Agency is concerned about potential ground water contamination for all registered uses of carbofuran. Carbofuran has the potential to move (leach) through the soil and contaminate ground water which may be used as drinking water. Carbofuran has been found in ground water as a result of agricultural use. The Agency does not have the data necessary to fully assess the extent of ground water contamination associated with the registered uses of carbofuran. The Agency has required the registrant submit monitoring studies pertaining to ground water contamination from use of carbofuran in the registration standard. Ground water in certain parts of California, Iowa, Maryland, New York, and Wisconsin has been monitored for carbofuran. There are confirmed findings of carbofuran in ground water in Maryland, New York and Wisconsin, which in all likelihood, stemmed from normal agricultural use. (It should be noted that

the toxic, potentially leachable metabolite 3-hydroxycarbofuran was not analyzed for most of these studies. The Agency will continue to monitor carbofuran contamination in ground water through the National Drinking Water Survey.

If the Agency determines that use of carbofuran may result in significant contamination of ground water, the Agency will consider regulatory actions necessary to reduce exposure to carbofuran through this source.

II. REBUTTAL SUBMISSION PROCEDURES

All registrants and applicants for registration are being notified by certified mail of the Special Review being initiated on their granular carbofuran products registered for all use sites. The registrants and applicants for registration will have 45 days from the date this Notice is received or until (insert date 45 days after date of publication in the FEDERAL REGISTER) (whichever is later) to submit evidence in rebuttal to the Agency's presumption. Other interested parties may submit comments during the same period.

III. DUTY TO SUBMIT INFORMATION ON ADVERSE EFFECTS

Registrants are required by section 6(a)(2) of FIFRA to submit any additional information regarding unreasonable adverse effects to man or the environment which comes to their attention at any time. Registrants of carbofuran products registered for use on agricultural crops must immediately submit any published

or unpublished information, studies, reports, analyses, or re-analyses regarding any carbofuran effects in animal species or humans, and claimed or verified exposure incidents involving humans, domestic animals, fish and aquatic life or wildlife which have not been previously submitted to EPA. These data should be submitted with a cover letter specifically identifying the information as being submitted under section 6(a)(2) of FIFRA. Registrants should notify EPA of any studies on carbofuran currently in progress, their purpose, the protocol, and approximate completion date, a summary of all results observed to date, the name and address of the laboratory performing the studies, and a statement as to whether these studies are being conducted in accordance with the Good Laboratory Practices specified in 40 CFR Part 160.

IV. PUBLIC COMMENT OPPORTUNITY

During the time allowed for submission of rebuttal evidence, specific comments are solicited on the presumptions set forth in this Notice. In particular, any documented episodes of adverse effects on humans, domestic animals, or wildlife should be submitted to the Agency as soon as possible. Any information as to any laboratory studies in progress or completed should be submitted to the Agency as soon as possible with a statement as to whether those studies are in compliance with the Good Laboratory Practices specified in 40 CFR Part 160. Specifically, the Agency requests information on any adverse wildlife effects associated

with carbofuran, its impurities, metabolities and degradation products on all sites where the use of granular formulation of carbofuran is registered. Similarly, the Agency requests submission of any studies or comments on the benefits from the use of carbofuran on all sites registered for granular formulations. All comments, information, and analyses which are submitted or otherwise come to the attention of EPA, may serve as a basis for final determination of regulatory action following the Special Review.

All comments and information should be sent to the address given above, preferably in triplicate, to facilitate the work of EPA and others interested in inspecting them. The comments and information should bear the identifying notation [OPP-30000/48].

During the comment period, interested members of the public or registrants may request a meeting to discuss the risk issues and methods of reducing risks. Written memoranda describing and materials exchanged at such meetings may also be filed under docket number OPP-30000-48.

V. REFERENCES

(1.) Balcomb, R., Bowen CA II, Wright D., Law M. 1984a. Effects on wildlife of at-planting corn application of granular Carbofuran. J. Wildl. Manage. 48(4): 1353-1359.

(2.) Hudson, R. H., Richard, K. T., Haegele, M. A. 1984. Handbook of Toxicity of Pesticides to wildlife. U.S. Dept. of the Interior. Fish and Wildlife Service.

(3.) Balcomb, R., Steven R., and Bowen CA II. 1984b. Toxicity of 16 granular insecticides to wild-caught Songbirds. Bull. Environ. Contam. Toxicol. 33: 302-307.

(4.) Erback, D.C., and Tollefson, J.J. 1983. Granular insecticide application for corn rootworm control. Trans. Am. Soc. Agri. Eng. 26: 696-699.

(5.) FMC. 1983. Effects of Furadan® formulations 10G and 15G on avian populations associated with corn fields.

(6.) Overgaard, N.A., Walsh, D.F., Hertel, G.D., Barber, L.R., Major, R.E., Gates, J.E. 1983. Evaluation of modified POWR-TILL seeder for soil incorporation to provide insect control and minimize bird mortality. U.S. Dept. of Agric. For. Serv. Tech. Publ. R8-TP3. 35pp.

(7.) Flickinger, E.L., King, K.A., Stout, W.F., Mohn, M.M. 1980. Wildlife hazards from Furadan® 3G applications to rice in Texas. J. Wildl. Manage. 44: 190-197.

(8.) Bednarz, J.C., and Dinsmore, J.J. 1981. Status, habitat use, and management of red-shouldered hawks in Iowa. J. Wildl. Manage. 45(1).

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(9.) Balcomb, R. 1983. Secondary poisoning of red-shouldered hawks with carbofuran. J. Wildl. Manage. 47: 1129-1132.

All reference material is available for review in Room 236 at the Virginia address given above.

Dated: 9/30/85

Director,
Office of Pesticide Programs.